Cautionary Statement

This presentation contains forward looking statements that are subject to risk factors associated with, amongst other things, the economic and business circumstances occurring from time to time in the countries and sectors in which Johnson Matthey operates. It is believed that the expectations reflected in these statements are reasonable but they may be affected by a wide range of variables which could cause actual results to differ materially from those currently anticipated.
Introduction and Welcome

Neil Carson
Chief Executive
JM Executive Board

Neil Carson
Chief Executive

Robert MacLeod
Group Finance Director

Larry Pentz
Executive Director
Environmental Technologies

Bill Sandford
Executive Director
Precious Metal Products
## Other Senior Management

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<td>Mark Bedford</td>
<td>Director</td>
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<td>Precious Metals Marketing</td>
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<td>Bernadette O’Connell</td>
<td>Division Finance Director</td>
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<td>Raymond van der Heijden</td>
<td>Managing Director</td>
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<td>Neil Whitley</td>
<td>Division Director</td>
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<td>Catalysts, Chemicals and Refining</td>
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<td>Brian Woodward</td>
<td>General Manager</td>
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<td>Medical Components, North America</td>
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<td>Ian Godwin</td>
<td>Director</td>
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<td>Investor Relations</td>
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<td>Sally Jones</td>
<td>Public Relations Manager</td>
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# Programme

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<td>Bill Sandford</td>
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<td>Pgm Trading and Marketing</td>
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<td>Refining</td>
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Purpose of the Day

**Provide**
a deeper understanding of Precious Metal Products Division, its strategy and drivers

**Highlight**
why it is such an intrinsic part of the group

**Outline**
JM’s role in the global pgm market and the dynamics of the businesses

**Explain**
the role of R&D in adding value and providing future growth opportunities
Precious Metal Products Division Strategy

Leverage our deep understanding of:
- Catalysis and pgm chemistry
- Materials science and manufacturing

Provide customer solutions through investment in R&D

Offer first class services to our external and internal customers

Deliver superior growth
Precious Metal Products Division

The original core of Johnson Matthey’s activities

Contains much of the group’s metal intensive activities

- Hence sensitivity to metal prices
- Metal management remains critical
- Innovation drives success

Division performed well in recent years

- Profit growth of 17% CAGR in last five years
- ROIC >40%

PMPD is split into two activities

- Services
- Manufacturing

Sales ex pms 2010/11

- £541m
  - 35%
  - 65%
Precious Metal Products Division

Services

**Critical offering to the group and its customers**

Comprises:

- Precious Metals Marketing and Distribution (PMM)
- Pgm Refining
- Gold and Silver Refining

**Sales ex pms in 2010/11 of £180m**

- PMM accounts for just under half of Services’ sales ex pms

**Margins are highly dependent on metal prices**
Global Drivers Impacting PMPD’s Services Businesses

- Emission control catalysts
- Obscuration enamels
- Automotive
- Electronics
- Petrochem catalysts and processes
- Construction
- Bulk chemicals
- Population Growth
- Urbanisation
- Increasing Wealth
- Natural Resource Constraints
- Environmental Factors
- Climate Change
- Regulation
- Health & Nutrition
- Ageing
- Population
- Ammonia synthesis & nitric acid catalysts
- Gas / coal to products technology
- Energy security
- Alternative energy
- Resource efficiency
- Recycling
- Emission control
- Low carbon
- Hydrogen catalysts
- Purification products
- Fuel cells
- Carbon capture and storage (CCS)
- Pgm catalysts
- APIs
- Medical components
- Fine chemicals

Johnson Matthey attributes deliver superior growth
Pgm Trading and Marketing

Mark Bedford
Director, Precious Metals Marketing
Pgm Trading and Marketing Activities

70 staff globally:
- Based in UK, US, Hong Kong, China, Japan, Russia and Brazil

Business is split into two key areas:
- Trading
- Market research and development for Anglo American Platinum

A high margin / ROIC business:
- Majority of income comes from trading
- Current sensitivity to pgm price variation: +10% = £4 million
Trading
A Strategic Function for the JM Group

Pgm “treasury” for JM group
- Ensures the group remains hedged
- Optimise group stocks
  - Group working capital requirements
  - Customer metal
- Impacts group borrowing requirement

Sales of pgms to internal and external customers
- JM is the largest supplier of pgms for physical use, around 5 million oz p.a.
- 24 hour price coverage (UK, US, Hong Kong)
- JM Base Price is an industry benchmark
- Pgms sourced from producers, refining customers, broader market
Trading

Stocks held on three continents
- Metal held in different forms and purity
- Typically sponge, ingot, grain
- Ability to convert forms important
- Link to JM refinery is critical

Trading profits depend on market prices, volatility and volumes
- Typical buy / sell spreads: Pt and Pd $5/oz, Rh $50/oz

Pgm market expertise adds value to group product and technology offerings
JM and Anglo American Platinum
A Mutually Beneficial 80 Year Relationship

Anglo is the world’s largest platinum producer

JM appointed Marketing and Refining Agent in 1931:
- Remains subject of long term contracts
- Multi facetted relationship including supply, marketing, refining, fuel cell JV

Market development remains important to Anglo:
- Anglo holds the largest platinum reserves in the world

Under marketing agreement JM provides marketing services:
- Market research
- New product and market development
- JM receives income which is related to pgm prices
Market Research

Ten year pgm market forecast is a cornerstone of Anglo planning

- JM uniquely positioned to maintain an authoritative view
- Undertake specific market studies
- Study trade flows
- Presentations, external / internal
- Informs JM ‘Platinum’ book
Market Development

**Activity beneficial to both JM and Anglo**

- Anglo supports demand creation, both geographic and new product development
- JM provides expertise, technology and market access
- Historical focus on emission control catalysts and jewellery
- New focus on accelerating fuel cell commercialisation
- Supported by suite of printed and on-line publications

![Diagram: JM R&D Spend vs Gross Pt Demand](chart.png)

- Pt Demand, '000 oz (source: JM)
- Theoretical Pt Demand Growth (in line with global GDP growth from 1987)
- JM (gross) R&D Spend, £m (source: JM Annual Reports)
New Product Development

Innovation remains a key market driver

JM undertakes R&D across the broadest range of pgm products
- Over 1,000 people in R&D
- Around 70% of JM products are pgm based
- Core competence – control at the atomic scale

Anglo funds specific research programmes:
- e+™ ethylene scavenger commercialised
- Catalysts for escape hoods in final testing
- Promising projects in biomass conversion and steel modification at an earlier stage
Summary

- Pgm Trading and Marketing is profitable and cash generative for JM group
- Core trading activity strategic for JM group and its customers
- Long term and mutually beneficial relationship with Anglo American Platinum
- Profit is influenced by pgm prices and volatility
- Effective market development supportive of volumes and prices
- Robust fundamentals should help pgms weather economic weakness and support rising prices in longer term
Refining
A Critical Service to both Internal and External Customers

- The largest secondary refiner of platinum group metals - over 100 tonnes p.a.
- Largest refiner of gold and silver, processing circa 3,000 tonnes p.a.
- ‘7 metal’ capability critical given variety of inputs (Pt, Pd, Rh, Ru, Ir, Au, Ag)
- Johnson Matthey operates worldwide from five refineries located in UK(2), US(2) and Canada
- 800 employees

- Strong reputation and trust in Johnson Matthey name
- Continued investment in process efficiency and capacity
- Good returns on sales and ROIC well above group target
Variety of Refining Materials Processed

**Pgm Refining**
- Major customers
  - Internal JM businesses
  - Autocatalyst collectors e.g. Multimetco, Techemet
  - Miners e.g. Impala, Lonmin, Stillwater
- Profitability influenced by pgm price movements

**Gold and Silver Refining**
- Major customers
  - Primary miners e.g. Goldcorp, Yamana, Barrick, Coeur
  - Secondary – jewellery scrap e.g. Kahan
- Profitability influenced by Au / Ag price movements

**Analysis of Outputs**
- Primary Gold 65%
- Secondary Gold 35%
- Autocat Scrap 35%
- JM Product Customers 32%
- Other 8%
Strong Relationship Between Metal Prices and Intakes

- Refineries have high fixed costs hence the importance of managing both the \textit{volume and mix} of intakes against refining capacity.
- Intake levels driven by:
  - Price expectations... more for secondary markets.
  - General economic activity (ex-industrial materials).
- While some short term fluctuation, over the medium to long term, demand for refining remains less price dependent e.g. primary volumes.
Johnson Matthey has a Strong Market Offering

Ability to process range of materials and grades
- JM is one of a limited number of ‘full’ refiners with expertise in all precious metal feeds (low and high grades)
- Dedicated separation and purification of insoluble pgms – Rh, Ru and Ir

Barriers to entry for ‘full’ refiners are high
- Metal management and security
- High initial asset investment and management of working capital

Key competitive advantage
- JM reputation and longevity
- Complex chemistry (sampling, assay, pyrometallurgical and hydrometallurgical knowledge and methods)
- Global presence / supply-refine offering
Refining Business Model

**Deliverable**
An agreed quantity of metal to be deposited into customer’s account at a future date against an agreed assay content

**Contractual terms**
- Treatment charges (per tonne of material processed) can vary from £2k to £30k/tonne
- Refining charge (per ozt pms recovered) varies according to grade of material
- Agreed lead time...from days to months

**Nature of refining service**
- Closed Loop (industrial application supply / refine loops)
- Open Loop (consumer / EOL applications)

**Output**
- Pgm sponge
- London Good Delivery (LGD) bars and other investment ‘products’
Pgm Refining – Diverse Source of Pgm Input Materials

- Amount of pgms refined which support JM production or JM supplied products is ~32%
- Estimated overall JM share of global pgm refining believed to be around 25%
- Strong drivers for pgm refining business going forward
- End of life (EOL) autocatalyst is the strongest growth area where JM has a leading market position
- Majority of EOL autocatalyst processed from part concentrated material received from third party collectors

Source: JM estimates
Spent Autocatalyst – A Major Growth Driver

- Global scrap volumes expected to grow 6% CAGR for period 2011 to 2020
- JM inputs include part processed metal concentrate, spent catalyst and production scrap

- Regional variation in ratio of metal recovery
  - Europe – diesel; Pt heavy
  - North America – gasoline; Pd heavy
- Recycling legislation
Gold and Silver Market Conditions Buoyant

**Recent high prices**
- Underpin new mine expansion and development of existing mines
- Encourage strong secondary / scrap market (principally gold)

**Primary:** strong growth from mine production in JM’s target markets
- Gold – projects in Canada, Colombia, Dominican Republic and Ecuador
- Silver – Mexico, Argentina, Chile, Dominican Republic and Peru

**Secondary:** target market is collectors in USA and Mexico

**Strong JM balance sheet, reputation and dual site capability are major assets**

**Investment in efficiency and capacity**
Structural Long Term Growth Drivers

- **New pgm applications** growing in electronics, pharma (supply-refine model) and other industrial applications

- Growth in refining of **insoluble metals** from catalyst and electronic applications which are particularly difficult to process

- **New recycling legislation** for EOL electronic products expected to boost demand for recycling/refining of pgms

- Legislation continues to tighten in many countries regarding the **export of waste** hence markets becoming closed. Regional expansion opportunities e.g. China

- Opportunities for **new industrial applications** using gold and silver
Summary

Global ‘full precious metal refiner’
- Processing several £bn of metal for customers
- Provides a critical internal service to other JM divisions

Service business based on reputation, know how and metal management

- As industrial demand for precious metals continues to rise, efficient recovery of high value recyclables is essential

Refining increasingly important as customers demand sustainable source

JM well placed to benefit from the largest growth sectors – end of life autocatalyst refining

Good return on sales and high ROIC
Precious Metal Products – Manufacturing

Bill Sandford
Executive Director, Precious Metal Products
Precious Metal Products Division

Established business growing through innovation
Comprises:
- Noble Metals
- Colour Technologies
- Catalysts and Chemicals

Sales ex pms in 2010/11 of £361m
Margins typically high ‘teens / low 20s %
All businesses have high ROIC
- Typically in excess of group target
Global Drivers Impacting PMPD’s Manufacturing Business

- **Emission control catalysts**
  - Obscuration enamels
  - Automotive
  - Electronics

- **Pgms**
  - Petrochem catalysts and processes
  - Construction
  - Bulk chemicals

- **Population Growth**
  - Urbanisation
  - Increasing Wealth

- **Health & Nutrition**
  - Ageing Population

- **Natural Resource Constraints**
  - Environmental Factors
  - Climate Change
  - Regulation

- **Energy security**
  - Alternative energy
  - Recycling

- **Gas / coal to products technology**
  - Resource efficiency

- **Catalysts**
  - Pgm refining

- **Environmental factors**
  - Low carbon
  - Hydrogen catalysts
  - Purification products

- **Abatement technologies**
  - Emission control catalysts
  - Fuel cells
  - Carbon capture and storage (CCS)

- **Pharmaceuticals**
  - Agricultural Chemicals

- **Ammonia synthesis & nitric acid catalysts**

- **Fine chemicals**

- **Medical components**

- **Johnson Matthey attributes deliver superior growth**
Noble Metals
Noble Metals

**Pgm metallurgical business**

**Plays to our core competences**
- Pgm metallurgy
- Pgm metal management
- Pgm R&D

**Fabricates approx. 45 tonnes pgm p.a.**

**Two broad product categories**
- Industrial products
- Components for medical devices

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**Sales ex pms 2010/11**

- **£122m**
- 70%
- 30%
Noble Metals – Industrial Products
About the Business

Two production sites worldwide
- Royston, UK and West Whiteland, USA

Pgm alloys formed into wire, sheet, tube, thermally sprayed coatings

Two main product categories;
- Nitro catalysis
- Pgm products metallurgical applications

Unique properties of pgms
- Corrosion resistant
- High melting points (Pt 1,768°C, Ir 2,446 °C)
- Good structural properties, especially at high temperature
- Catalytic, electrical and sensing properties
- Decorative

Sales ex pms 2010/11
- £85m
- 55%
- 45%

Nitro Catalysis
Metallurgical
Nitro Catalysis
Pgm Catalysts

A complete package of products and services

High performance catalysts and catchments

Ability to recover the maximum amount of pgms
• Initial catalyst losses are significant
• On-site clean down for dispersed pgms

Values involved are significant
• Approx. $60m product per campaign
• Approx. $6m pgm catalyst / catchment
  • Includes $250k added value

Technology development important for customer and JM
Nitro Catalysis – Pgm Catalysts
A Leading Global Position

Catalysts / catchments manufactured in two locations
• Royston, UK and West Whiteland, USA

Supplied globally except countries with high import tariffs
• Principally BRIC countries
• Licensees in China and Russia

Leading supply position
• High share of supply in all regions of the world

Supply to Sector – Pgm Catalysts
Total 2010/11 £80m
52% JM
48% Hereaus, Umicore, Others
Nitro Catalysis – Pgm Catalysts

Market Drivers

**Fertiliser demand being driven by**
- Growing population
- Increased meat consumption
- Growing wealth in developing countries

**China fastest growing market**

**Demand for nitrate fertilisers expected to grow worldwide 2 - 3% CAGR**

**JM sales will grow faster as innovation continues**
- Mid / high single digit CAGR
Nitro Catalysis – N₂O Abatement
A Recent, Profitable Addition to our Catalyst Business

1997 Kyoto Agreement covered all greenhouse gases
N₂O is 310x CO₂
A major by product during ammonia oxidation
• Approximately 500 plants worldwide
• ~10% of world N₂O comes from ammonia oxidation
• Equivalent to 125 million tonnes of CO₂ p.a.

Two options for abatement
• Large tailgas plants – Uhde, NE Chemcat, CRI
• Secondary, base metal catalyst systems

Johnson Matthey collaboration with Yara, carbon traders
Represents 16% of nitro catalysis sales ex pms
Metallurgical Products
A Wide Range of Industries and Applications

Glass
Protection of glass forming ceramics

Automotive
Spark plug electrodes, airbag initiators, lambda sensors

Aerospace
Ignition tips, turbine blade pinning alloys

Sensing applications
Temperature sensing, gas sensing

No single product dominates
Metallurgical Products

Global sector – ~£170m
- Import duties in some territories
- Some mature / low margin products

We target higher return products
- Leverage our R&D capability
- Novel alloys
- Complex / difficult manufacturing technologies

Licensees in some countries

Share of supply ~40% in target sector (£120m)
- Growing at 5% CAGR
- ROIC above group target

Spark Plug Performance

[Graph showing life (miles) over decades: 1970s, 1980s, 2000s]

- 1970s: <10,000
- 1980s: 40,000
- 2000s: 120,000
Summary

**JM technology leader**

**Products requiring R&D growing ahead of GDP**
- Others in line with GDP

**High return business**
- Ahead of group ROIC target

**Expected growth in sales ex pms around 7%**
Noble Metals – Medical Components

Brian Woodward
General Manager, Medical Components, North America
Noble Metals - Medical
Precision components for healthcare devices

Targeted industry sectors:

Cardiovascular
- Cardiac Rhythm Management (CRM)
- Stents
- Electrophysiology (EP)

Neurological

Cochlear Implants

Sales ex pms 2010/11
- Cardiovascular: 84%
- Neurological: 10%
- Cochlear: 6%

Total: £37m
The Global Medical Device Industry

Total $300bn

Medical Device Sector

COMD $142bn

Cardiovascular
Orthopaedic
MIS
Diagnostic

Cardiovascular
• CRM
• Stents
• EP
Neurological
Cochlear

$41bn

Sales ex pms

Components

$300m
A Global Business, Headquartered in USA

Device market emerged in USA ~25 years ago
- Large corporates remain US based

Noble Metals an initial supplier
- Raw material produced in Philadelphia / Royston
- Prototype / final manufacturing in California / Australia

Product dimensions have reduced dramatically
- Added value exceeds pgm value
- Product shipment costs relatively minor
- Technically demanding production processes
- Automation / skilled workforce

Proximity to customer HQ / R&D critical
A Strong Position in a Growing Market

**Unique product offering**
- Pgm know how is critical
- Commitment to R&D
- Significant technology investment
  - Production to tightest specifications
  - Rapid development of prototypes

**Global operations**
- 5 manufacturing sites
  - US (3) – San Diego, San Jose, CA, Philadelphia, PA
  - UK (1) – Royston
  - Australia (1) – Melbourne
- 300 employees
A Unique Product Offering
Platinum and Nitinol

Benefits of platinum
Chemical properties
• Biocompatible and corrosion resistant
• Harmless to the blood stream
Physical properties
• Radio-opaque (visible under X-ray)
Electrical properties
• Highly conductive

Key properties of nitinol
Physical properties
• Superelastic
• Shape memory
Medical properties
• Biocompatible
Medical Device Components
A $300m p.a. Sector

- Diagnostic and therapeutic catheters
- Treatment of heart arrhythmias
- Pgm electrode rings and tips

The catheter tip delivers bursts of high-energy waves that destroy the abnormal areas

Growing at CAGR 8%

Catheters and Stents

Growing at CAGR 9%

- CRM
- Stents
- Neurological
- Rest
- Electrophysiology
- Cochlear

Implants and devices to aid the management of
- Chronic pain
- Stroke
- Seizure disorders
- Hearing impairments

JM pgm components
- Fine wires
- Sheets
- Tubes
- Micro machined parts

Growing at CAGR 10%

Cardio surgery, monitoring and diagnostics, rhythm management

JM components
- Marker bands
- Fine wires
- Electrode rings
- Micro machined parts

Growing at CAGR 6%
CRM Applications
Pacemaker / Defibrillator

Machined parts Pt/Ir, MP35N, stainless

Pgm through - wires

Pgm shocking, electrodes alloy rings

Pgm wire ribbon for shocking electrodes

Pgm active fixation leads Pgm/TiNi coated assembly

Pgm active fixation leads
JM Share of Components Sector

$300m

Major Competitors:
• Accellent
• SAES/Memry
• rms Co.
• Heraeus

Key Customers:
• Medtronic, Boston Scientific, St. Jude Medical, J & J, Abbott, Terumo
Market Drivers

Demographics and Lifestyle are Driving Growth

- Increasing ageing population
  - 256 million additional people over 65 by 2020
- Unhealthy lifestyles
  - >65% market currently in North America / Europe
- Obama Health Care Bill
- Increasing wealth in developing countries
  - Changing diet and lifestyle
  - Emerging market for medical devices

Population growth, urbanisation, increasing wealth

Health and nutrition, ageing population
Summary

- Good match to JM manufacturing and metallurgy know how
- Well positioned in key growth market sectors
- Strategically aligned with global device manufacturers and developers
- Added value that impacts the quality of human life
- Delivering
  - CAGR 6 - 8%
Colour Technologies

Raymond van der Heijden
Managing Director, Colour Technologies
Colour Technologies
High Performance Materials for the Glass and Ceramic Industry

Exploits JM’s ability to develop surface technologies

**HQ**
Headquartered in Maastricht, Netherlands

**Manufacturing sites**
in Netherlands, UK, USA, Korea

**Distribution centres**
in China, Thailand, Mexico and Brazil

**Employs**
350 people

Maastricht
Business has Changed Significantly in Recent Years

**Originally a traditional decorative business**
- Servicing ceramics and glass industries

**Has transitioned into a largely functional product business**
- Functional to decorative ratio was 30% : 70% ten years ago
- Emphasis on technology development
- Higher margins, growing markets

**Started in Europe**
- Now manufacturing on three continents
- Global customers

**Key drivers are worldwide car production, regional GDP**

Sales ex pms 2010/11

- £82m
- Decorative 40%
- Functional 60%
Colour Technologies

**Products**
- Glass obscuration enamels
- Silver products
- Decorative and functional precious metals
- Colours and glazes

**End Uses**
- Automotive
- Automotive and electronics
- Glass and ceramic
- Ceramic, glass, electronic and architectural

**Sales ex pms 2010/11**
- £82m
  - Asia 28%
  - Americas 17%
  - EMEA 55%
Automotive Products
Black Obscuration Enamels

Originally developed as a product to protect glass seal – now part of the aesthetic and design features

Specific properties for each OEM, each platform:
• Enabler for specific glass forming processes
• Chemical durability
• Specific properties for all different types of car glass

Constant innovation key to success
• Reluctance to change after initial approval

Major customers
• NSG, AGC, St Gobain, Fuyao
Automotive Products
Black Obscuration Enamels

Sector growing with car production
Sales / profit growing quicker
• New product development
• Usage per car increasing on new models

Future growth in BRIC countries
• We have large share in China
• Facility in India under construction

High share of supply – 45% of total
Small number of global competitors
• Ferro largest

Sales ex pms 2010/11
£93m

JM 45%
Other 55%
Silver Coating Technologies
Two Key Markets: Automotive Glass and Electronics

**Automotive**
Conductive silver based technology
Uses the businesses expertise
- Blending powders and flakes to pastes for screen printing
- Technically demanding functional pastes

Ability to deliver fine conductive tracks for
- De-misting car rear windows, radio aerials and alarm circuits on vehicle glass

Complementary to obscuration enamel business

*Share of supply ~30% of a total sector of £17m*
Silver Coating Technologies
Two Key Markets: Automotive Glass and Electronics

**Electronics**
Leveraging our expertise in
- Producing powders and flakes
- Incorporating silver into organic media

More recently extended our technology into electronic applications
- Flexible circuit boards
- Input devices / touchscreens
- Conductive coatings for the passive components industry
- We have a small (<10%) share of total sector but focus is on niche markets
- Evaluating opportunities for future growth
Precious Metal Solutions

Traditional decorative products with growing focus on functional applications

Decorative
• Largely gold and some platinum solutions applied to glass and ceramics
• Colour and durability important
• Business in slow decline due to fashion / trend change and recent high metal prices

Share of supply 28% of a total sector of £20m

Functional
• Makes use of special characteristics to enhance durability, heat resistance etc.
• High performance products – aerospace, electronics etc.
• R&D work on new applications
Decorative Colours

Comprehensive product portfolio
Used on flat / container glass and ceramics
Consistency and technical performance are key
We only compete on higher margin / return business
• Appliance glass
• Architectural (inkjet application)

Share of supply 20% of a total sector of £90m
Sector growth ~GDP
Summary

A business with a growing technical content

High market shares
Bespoke products, high R&D content, defendable margins

High ROIC

Good sales growth
5% CAGR in last five years, expected to continue

Opportunities
for new products / markets being evaluated:
• Functional coatings
• High R&D requirement
Catalysts and Chemicals

Neil Whitley
Division Director, Catalysts, Chemicals and Refining
Catalysts and Chemicals
Well Balanced with Applications Across Many Sectors

£157m
total sales in 2010/11

Wide ranging product
applications and end
markets

Sales ex pms 2010/11

Core strengths
in hydrogenation catalysts
and precious metals
chemistry

10 manufacturing sites
and 6 technical development
facilities in the US, Europe
and Asia

Important internal
supplier
to ECT and DPT accounting
for ~15% of sales in
2010/11

Good pipeline
of new products

£157m
Catalysts
65%
Chemicals
35%
Catalysts and Chemicals
65% Revenue from Faster Growing Catalyst Business

Catalysts – total sales of £103m
- Business margins range between 10% and 18%
- Cost of pgms and other expensive metals passed on to customers
- 15% growth in catalysts for the chemical industry with broadening range of products
- Edible oil and oleochemicals broadly flat
- Growing pharma catalyst business from low sales base

Chemicals – total sales of £54m
- Business margins around 20%
- Inorganic metal salts for catalytic converters which account for 40% of total sales
- New growth niches in speciality chemicals and powders for advanced alloys, gas sensors and electronics applications
- New patented ethylene scavenger to increase the shelf life of food
Catalysts and Chemicals
Products Serve a Wide Range of Industries

Sales ex pms (£157m) by end application

- Food 25%
- Construction 13%
- Automotive 13%
- Personal Care 13%
- Petrochem / Petroleum 10%
- Pharma / Fine Chem 6%
- Other 20%

- Electronics
- Aerospace alloys
- VOC removal
- Biomass conversion
- Gas sensors

- Edible oils
- Polyols
- Pigments
- Ethylene scavengers

- Polyols
- Fatty alcohols
- Oleochemicals
- Fatty amines

- Catalytic converters
- Amines / aniline
- Olefins / pyrolysis gas
- Solvents
- Nylon intermediates
- Acetiles
- Oxo alcohol
- Butanediol
- VCM
Catalysts
Global Sales with Strongest Growth in Asia

**Growth driven by population and higher disposable incomes in BRIC economies**

Asia growing strongly and now accounts for **28%** of total sales

Development work with DPT yields improved catalysts

Investment in **R&D** has broadened product range

Underpinned by hydrogenation catalysis strengths

![Sales ex pms by Region](chart.png)

- **Europe** 32%
- **North America** 37%
- **Asia** 28%
- **ROW** 3%

£103m
Catalysts
Growing JM in Chemical Catalyst Sector

• Around **25%** share of **$0.5bn** annual hydrogenation catalyst supply

• Business plans to exceed hydrogenation catalyst market growth through new product introduction

• New products include a mercury free catalyst for VCM and catalysts for olefin purification and also biomass conversion

• Looking to strengthen position in other segments particularly oxidation and dehydrogenation

• JM also market leader in syngas segment (business resides within Process Technologies)

![Chemical Catalyst Sector: Total $3.3 billion](image-url)
Chemicals

Asia now 43% of Total Sales and Growing Strongly

Faster growth in Asia from new electronics applications and automotive

Chemical salts for automotive remains important
• ~40% of total sales now vs. 55% in 2008/09

R&D enables good growth in new applications including:
• Pgm powders for ethylene scavenging and sensor devices
• Organometallic compounds for electronics

Sales ex pms by Region

- Asia 43%
- Europe 31%
- North America 26%

£54m
Catalysts and Chemicals
Well Placed to Achieve Mid to High Single Digit Growth

**Strong businesses**
with diverse end market applications

**Underpinned by strengths**
in catalysis and pgm chemistry

**Growing faster**
than the market through R&D and targeted development with customers

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**Grow further**
in hydrogenation, oxidation and dehydrogenation catalyst markets

**Deliver new products**
in olefins, biomass, VCM and electronics
Summary and Conclusions

Neil Carson
Chief Executive
Purpose of the Day

**Provide**
a deeper understanding of Precious Metal Products Division, its strategy and drivers

**Highlight**
why it is such an intrinsic part of the group

**Outline**
JM’s role in the global pgm market and the dynamics of the businesses

**Explain**
the role of R&D in adding value and providing future growth opportunities
Precious Metal Products Division Strategy

Leverage our deep understanding of:
- Catalysis and pgm chemistry
- Materials science and manufacturing

Provide customer solutions through investment in R&D

Offer first class services to our external and internal customers

Deliver superior growth
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>Ag</td>
<td>Silver</td>
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<tr>
<td>AGC</td>
<td>Asahi Glass Company</td>
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<td>API</td>
<td>Active pharmaceutical ingredient</td>
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<tr>
<td>Au</td>
<td>Gold</td>
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<tr>
<td>BRIC</td>
<td>Brazil, Russia, India and China</td>
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<tr>
<td>CAGR</td>
<td>Compound annual growth rate</td>
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<td>Carbon dioxide</td>
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<td>CRM</td>
<td>Cardiac rhythm management</td>
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<td>Davy Process Technology</td>
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<td>Emission Control Technologies</td>
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<td>Europe, Middle East and Africa</td>
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<td>EOL</td>
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<tr>
<td>EP</td>
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<tr>
<td>e+™️</td>
<td>Ethylene scavenger that postpones fresh produce ripening</td>
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<td>GDP</td>
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<tr>
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<td>Joint venture</td>
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<td>Nitrous oxide</td>
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<td>MP35N</td>
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<td>ROIC</td>
<td>Return on invested capital</td>
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<tr>
<td>ROW</td>
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<td>VCM</td>
<td>Vinyl chloride monomer</td>
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